

智慧醫療聊天機器人：透過多層次驗證與評估增加可信度與可持

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1. 摘要

This study builds a web-based chatbot to help breast cancer patients choose among twelve surgical options. A questionnaire-based weighted scoring system and decision tree rank options by clinical and personal factors; patients then ask follow-up questions answered by a fine-tuned Llama model drawing from a knowledge base, streaming responses in Traditional Chinese. The system stores feedback and aims to improve pre-visit education and decision-making.

Keywords: medical chatbot; breast cancer surgery; decision support; LLM; RAG; patient education

2. 畫緣由與目的

Reason: Breast cancer surgery consultations are brief, yet patients must process complex information about multiple treatment paths while still absorbing a new diagnosis. The problem is a mismatch between the information patients need and the time available — a structured digital pre-visit tool can bridge this gap without replacing physician judgment.

Purpose: This project develops a web-based chatbot with four objectives: (1) deliver procedure-specific pre-consultation education; (2) rank surgical options via questionnaire-based weighted scoring; (3) answer patient questions using a clinically grounded LLM; and (4) help patients arrive with clearer

priorities so consultation time is used more effectively.

3. 研究範圍

This study develops a web-based chatbot for pre-consultation breast cancer surgery education. The system collects patient preferences via questionnaire, ranks twelve surgical options through weighted scoring, refines choices with a decision tree, and answers procedure-related questions using a fine-tuned LLM. It covers topics such as risks, recovery, cost, and hospital stay, but does not replace clinical diagnosis or physician judgment — it serves solely as a pre-appointment preparatory tool.

4. 使用技術方法

Front end: HTML, CSS, JS
Back end: Django, Flask
LLM: Llama model

5. 架構流程

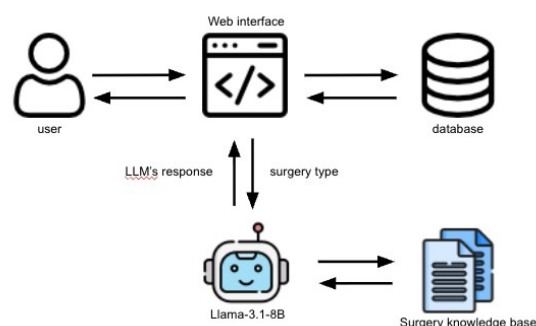


Figure 1. System's Architecture Diagram

6. 工具說明

We run fine-tuned Llama models on a GPU server through a Flask API, while Django serves the web application and proxies streamed chat replies via Server-Sent Events. After patients open the site and complete a structured questionnaire, a weighted scoring model and decision tree rank and refine twelve breast cancer surgery options. Users then ask questions about their chosen procedure; Flask classifies each query, retrieves content from a curated Excel knowledge base, and streams Traditional Chinese answers in real time. Survey data, chat logs, and user feedback are stored in SQLite so sessions and history can be reviewed on the website.

7. 實驗結果

Questionnaire for the user: Patients have to fill in a questionnaire regarding their personal health background, lifestyle, and surgical preferences to help the system recommend the most suitable breast cancer surgical option.

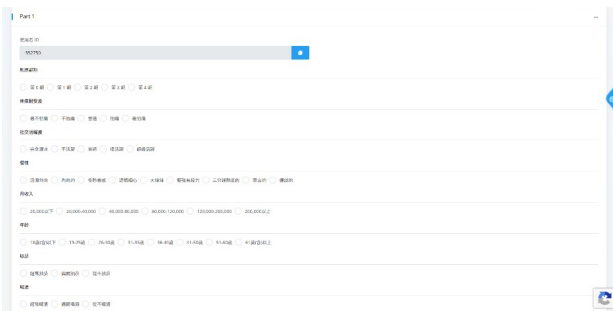


Figure 2. Questionnaire webpage

Main chatbot system: Patients can ask for information regarding the surgery.

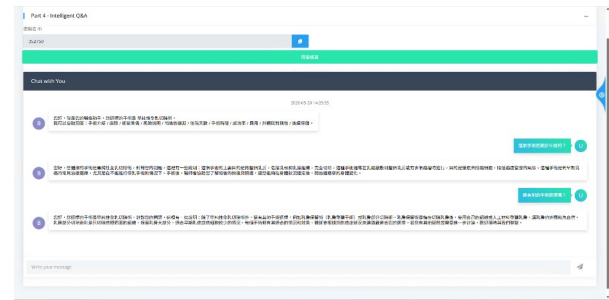


Figure 3. Main chatbot webpage

8. 結論

This project helps breast cancer patients prepare before their doctor's visit by offering personalized surgery recommendations and reliable, knowledge-based answers. It turns limited consultation time into more informed, focused discussions—supporting education and shared decision-making without replacing clinical judgment.

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